

or perforation through the polishing pad. The Applicants respectfully traverse the rejection.

Tzeng teaches a belt driven polishing apparatus using a polishing pad belt to polish a substrate. *Tzeng* also teaches a movable *in-situ* sensor to measure portions of the polishing pad belt along a zigzag trajectory. The sensor detects a reflected laser beam and then determines a distance to the reflection point by triangulation of incident and reflected laser beams. Further, the *in-situ* sensor retraces the same wear path during each revolution of the belt. Accordingly, the measurement trajectory is dependant on the movement of the *in-situ* sensor and the movement of the polishing pad belt. (See, Abstract, Figures 1-3, col. 1, lines 59-68, col. 2, lines 1-24, col. 3, lines 1-24, and col. 4, lines 51-64).

Tzeng does not teach, show, or suggest a chemical mechanical polishing pad having a plurality of reliefs in a main polishing surface for determining wear of the pad, wherein the reliefs are disposed in predetermined pattern such that the wear of the pad is determinable as a function of pad radius as recited in claims 1 and 3. *Tzeng* does not teach, show, or suggest an apparatus and method for measuring wear of the thickness of a chemical mechanical polishing pad by providing a plurality of reliefs disposed in predetermined pattern in a main polishing surface of the pad, then measuring a distance from the main polishing surface to a bottom surface of each of a plurality of the reliefs such that the wear of the pad is determinable as a function of pad radius as recited in claim 5. Therefore, Applicants submit that the rejection has been obviated and respectfully requests the Examiner to withdraw the rejection.

Claims 2, 4, and 7-13 stand objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants have rewritten claims 2, 4, 7, and 8 in independent form, and believe claims 2, 4, and 7-13 are in condition for allowance.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the method or process of the invention. Having addressed all issues set out in the office action, applicants respectfully submit that the

APPENDIX

1. (Amended) A chemical mechanical polishing pad having a plurality of reliefs in a main polishing surface for determining wear of the pad, wherein the reliefs are disposed in a predetermined pattern such that the wear of the pad is determinable as a function of pad radius.
2. (Amended) [The pad of claim 1] A chemical mechanical polishing pad having a plurality of reliefs in a main polishing surface for determining wear of the pad, wherein the reliefs comprise through-holes in the pad.
4. (Amended) [The pad of claim 1] A chemical mechanical polishing pad having a plurality of reliefs in a main polishing surface for determining wear of the pad, wherein the reliefs have a rectangular, square, triangular or round shape.
5. (Amended) A method for measuring wear of the thickness of a chemical mechanical polishing pad, the method comprising:

providing a plurality of reliefs in a main polishing surface of the pad; and

measuring a distance from the main polishing surface to a bottom surface of each of a plurality of the reliefs, wherein the reliefs are disposed in a predetermined pattern such that the wear of the pad is determinable as a function of pad radius.
7. (Amended) [The method of claim 5, comprising] A method for measuring wear of the thickness of a chemical mechanical polishing pad, comprising:

providing a plurality of reliefs in a main polishing surface of the pad, the reliefs being disposed in a predetermined pattern;

measuring a distance from the main polishing surface to a bottom surface of each of a plurality of the reliefs, wherein the pad has a radius;[, comprising:] and

[providing the reliefs in a predetermined pattern; and]

determining wear of the pad as a function of the pad radius, based on the relief pattern and the measured distances, to generate a pad wear profile.

8. (Amended) [The method of claim 5, comprising] A method for measuring wear of the thickness of a chemical mechanical polishing pad, comprising:

providing a plurality of reliefs in a main polishing surface of the pad, the reliefs being disposed in a predetermined pattern;

measuring a distance from the main polishing surface to a bottom surface of each of a plurality of the reliefs; and

[providing the reliefs in a predetermined pattern; and]

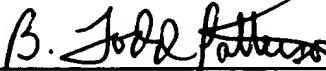
determining a wear rate of a first portion of the main polishing surface of the pad based on the relief pattern and the measured distances.

9. (Amended) The method of claim 7, wherein the pad wear is responsive to a process parameter, [the method] and further comprising altering the process parameter based on the pad wear profile.

claims are in condition for allowance and respectfully request that the claims be allowed.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, it is believed that a detailed discussion of the secondary references is not deemed necessary for a full and complete response to this office action. Accordingly, allowance of the claims is respectfully requested.

Respectfully submitted,


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